

May 2004 NC Weather Review

Overview

May continued the recent trend of months with drier and warmer conditions than the 30 year climatological average across North Carolina. The biggest news of the month was the unseasonably warm temperatures, which averaged 4 to 7 degrees above normal statewide. Raleigh-Durham (RDU) tied the warmest May on record, with an average temperature of 73.5 degrees. This was a whopping 6.5 degrees above normal, and ties the record which was set in 1953. Records have been kept at RDU since June of 1944. Greensboro (GSO) tied the 3rd warmest May on record with an average temperature of 71.6 degrees. This record was originally set in 1962. The only warmer months of May at GSO were recorded in 1953 and 1965. Records have been kept at GSO since April 1928.

The warm period began on the 6th and continued unabated through the end of the month. Every day between the 6th and the 31st saw above normal temperatures. The warm period peaked between the 21st and the 28th, when highs each day topped 90 degrees in locations east of the mountains and inland of the immediate coast. These readings were 10 to 15 degrees above normal. Several daily record highs were set during this stretch at Raleigh-Durham. The daily temperatures at Raleigh-Durham and Greensboro are highlighted in Figure 1 and Figure 2. A list of May records is shown in Table 1.

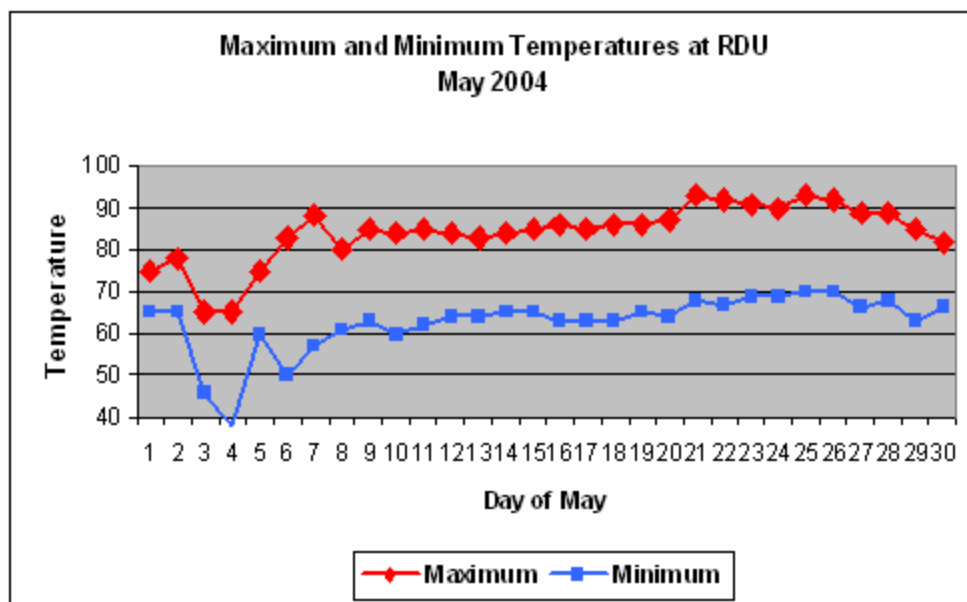


Figure 1 Daily maximum and minimum temperatures observed in May 2004 at Raleigh (RDU).

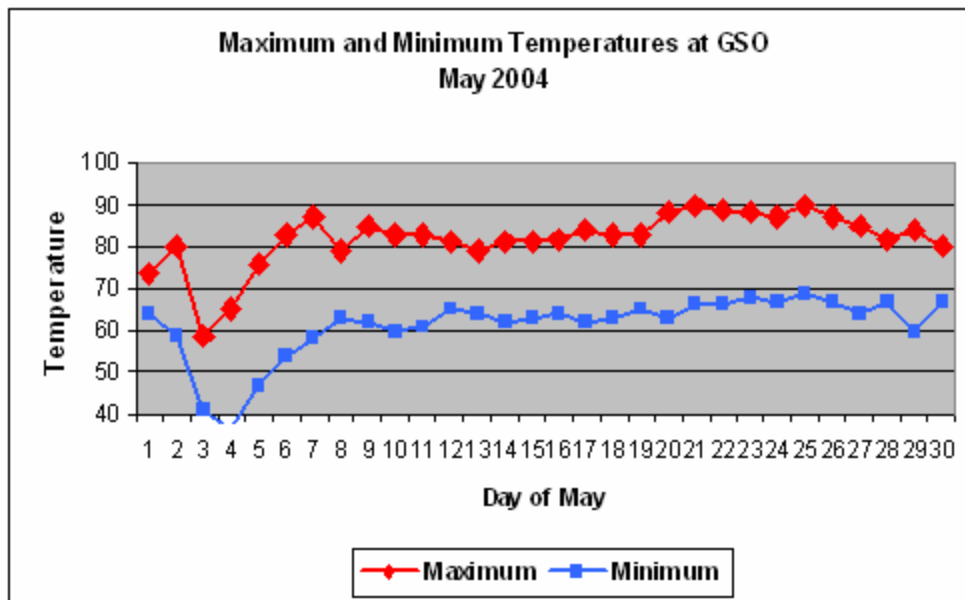


Figure 2 Daily maximum and minimum temperatures observed in May 2004 at Greensboro (GSO).

Daily Records

Location	Date	Record	Old Record	Year
Raleigh-Durham (RDU)	May 21, 2004	93 (tie)	93	1944
Raleigh-Durham (RDU)	May 22, 2004	92 (tie)	92	1953
Raleigh-Durham (RDU)	May 25, 2004	93	92	2002

Monthly Records

Raleigh-Durham (RDU)	Warmest May on record (tied with 1953).
Greensboro (GSO)	Third warmest May on record (tied with 1962).
Raleigh-Durham (RDU)	Greatest number of consecutive 90-degree days (6) in May.
Raleigh-Durham (RDU)	Greatest number of consecutive 80-degree days (26) in May.

Table 1 Records recorded during May 2004.

The rainfall deficit trend also continued during May, marking the 8th consecutive month of below normal rainfall at the majority of reporting stations. Rainfall generally ranged between 2 and 4 inches or about 1 to 2 inches below normal. Rainfall amounts were highly variable since most of the precipitation resulted from thunderstorms. There were localized areas that received near or above normal rainfall for the month. A few spots exceeded their average monthly rainfall in just one or two days. This was due to the localized nature of thunderstorms repeatedly moving over the same locations. Precipitation data for selected locations across North Carolina are shown in Figure 3.

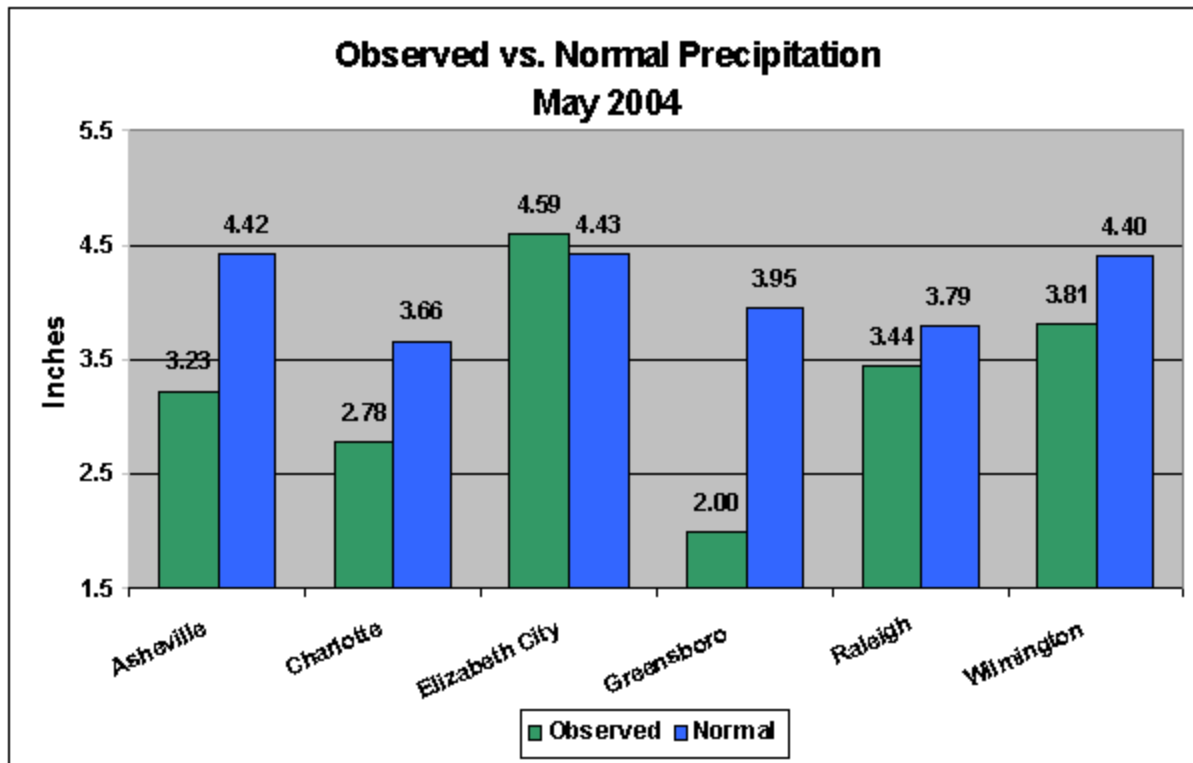


Figure 3 Monthly precipitation reports and normal for May 2004 at selected locations across North Carolina.

Details

Temperatures

May's climatological highlight was the unusually temperatures. The last 26 days of the month brought above normal temperatures to nearly every reporting station. This warmth was due to a strong and persistent upper-level high pressure system over the southeastern United States. Figure 4 shows the upper-level high as analyzed during the morning of May 21st. The high pressure system blocked larger scale storm systems from entering North Carolina. Widespread rain-producing systems were often redirected well north of North Carolina. With less in the way of clouds and rainfall, abundant sunshine was available to warm the landscape.

Lumberton, located in the southeastern part of the state, was the state's hot spot this month recording 10 consecutive days with temperatures of 90 degrees or more. Lumberton's warmest reading was a high of 97 degrees on the 25th. By contrast, Mount Airy and Boone in the northwestern part of the state did not reach the 90 degree mark during the month.

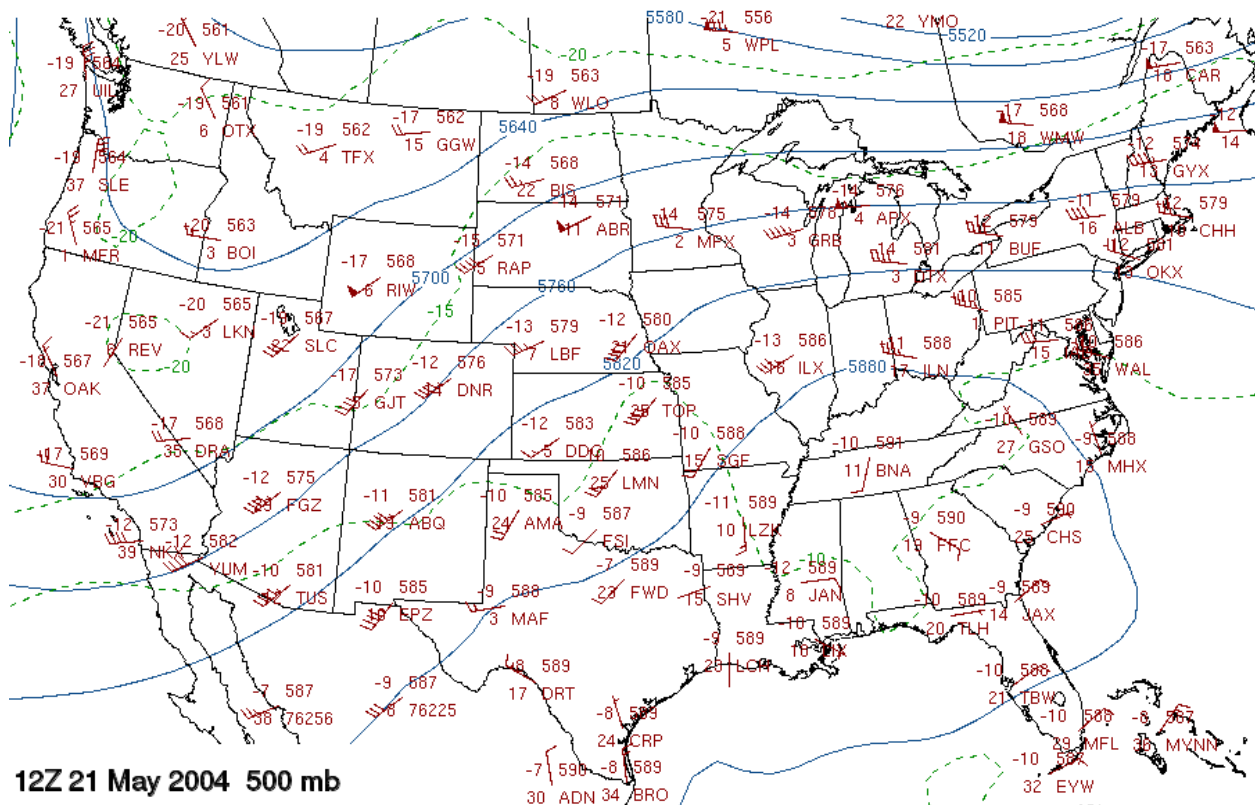


Figure 4 Analyzed upper air map from 12Z (800 AM EDT) May 21, 2004

Precipitation

Rainfall during the month of May generally averaged less than normal due to the persistent high pressure over the southeastern states. The first few days of the month brought widespread rainfall as a large upper level trough of low pressure moved east across the state. As this upper ridge strengthened, only widely scattered thunderstorm activity was observed during the rest of the month. The widely scattered thunderstorms resulted in large disparities in precipitation amounts, even over short distances. Several localized areas received above normal rainfall and even flash flooding during the month while the majority of the state remained relatively dry with little thunderstorm activity.

Locations along and near the Smoky Mountains and the Blue Ridge Mountains experienced above normal rainfall during May. These locations experienced warmer than normal temperatures which allowed the Appalachian diurnal convective season to begin about a month earlier than normal. Many areas along and near the Smoky and Blue Ridge Mountains experienced several days of diurnal thunderstorm activity while the rest of the state remained relatively dry.

Two reporting stations in Surry County, which is located in the northern Foothills region in northwestern North Carolina, are shown in Figure 5. While only 10 miles apart, the Mount Airy and Dobson sites demonstrate the large variability of rainfall during days with thunderstorms. The 2.70 inches at Dobson on the 16th of May resulted in flash flooding of streams and creeks in central Surry County. Meanwhile, Mount Airy in northeastern Surry County only received 0.03 inches of rain. Dobson recorded 6.26 inches for the month, while Mount Airy recorded 3.98 inches.

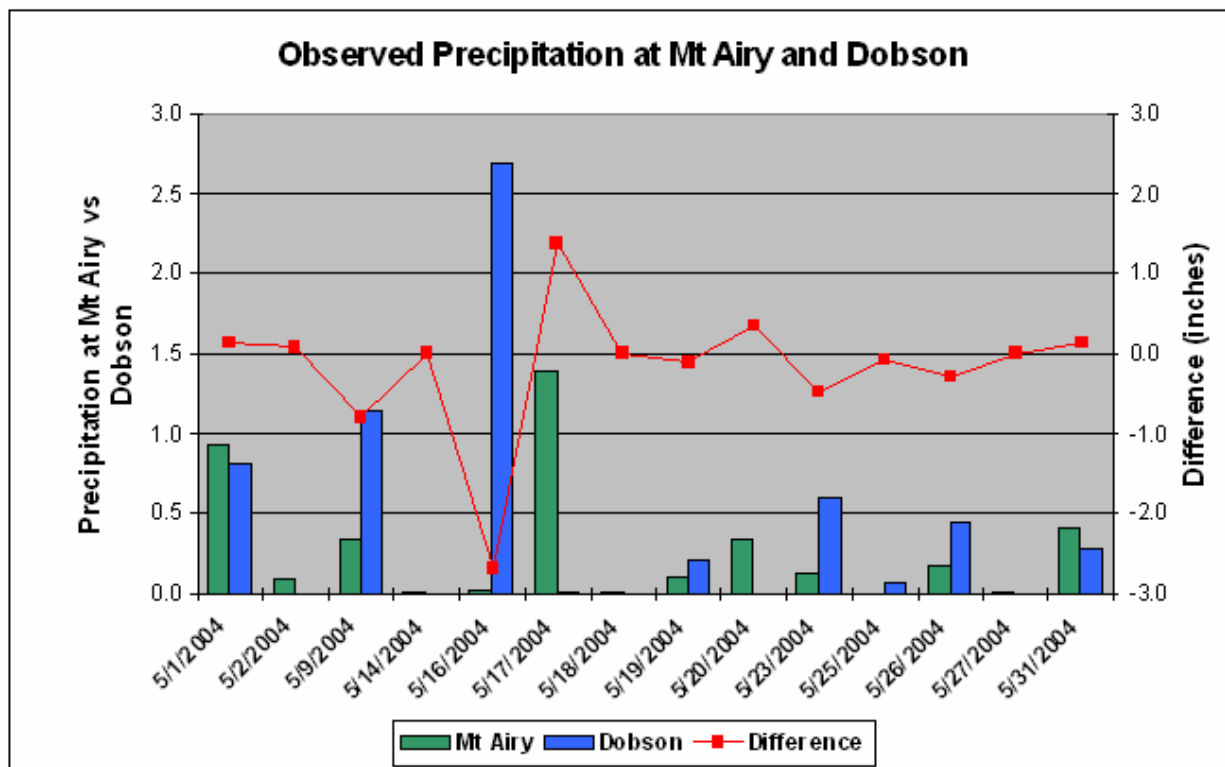


Figure 5 Rainfall reports during days in which precipitation fell at Mount Airy and Dobson in Surry County.

Like the Smokey and Blue Ridge Mountains, the Sandhills and Coastal Plain regions were another favored location for thunderstorm development during May. The thunderstorms that developed often produced frequent lightning and locally heavy rain. Two flash flood events occurred on the evening of May 22, 2004. One event occurred across Wilson and extreme southern Nash Counties, with the other event occurring later that night across Durham County.

The slow moving thunderstorms that moved across Wilson and Nash Counties on May 22nd produced rainfall rates in excess of 2 inches per hour. The result was 5 to 8 inches of rainfall centered over the city of Wilson. The Wilson County emergency manager measured 5 inches of rainfall in his rain gauge before it overflowed. The cooperative observer in Wilson measured 5.81 inches in less than 3 hours. Many streets and roads in Wilson and extreme southern Nash counties were flooded along with several downtown businesses. This flash flood rain event helped catapult Wilson to the wettest reporting station in North Carolina during May with a monthly rainfall total of 9.58 inches. This was in sharp contrast to the 2.00 inches of rain that fell in Greensboro.

Also on the night of the 22nd, thunderstorms in Durham County drenched the city of Durham as well as the county with 2 to 4 inches of rain. A portion of Interstate 85 was closed for several hours due to flooding.

Often the interaction between thunderstorms has a significant impact on the distribution of rainfall. Figure 6 shows the 24 hour precipitation estimate from the Raleigh Doppler Radar ending at 800 A.M. on May 23, 2004. The color bar at the top left of the figure depicts the estimated 24 hour precipitation amounts in inches (yellow, mustard, and orange colors are precipitation amounts of 2 to 4 inches, deep blue 4 to 6 inches, red 6 to 8 inches, and pink 8 inches or more). Note the 6 to 8 inch estimated maximum over Wilson County and the 5-inch maximum over Durham County. There is a minimum of rainfall over Wake and Franklin Counties as the storms completely “jumped over” those counties when the outflow boundary from the storms over Wilson raced west into southern Durham County. New thunderstorm development occurred along the outflow boundary over southern Durham County, missing Wake County and demonstrating the isolated nature of the Wilson and Durham flash flood events.

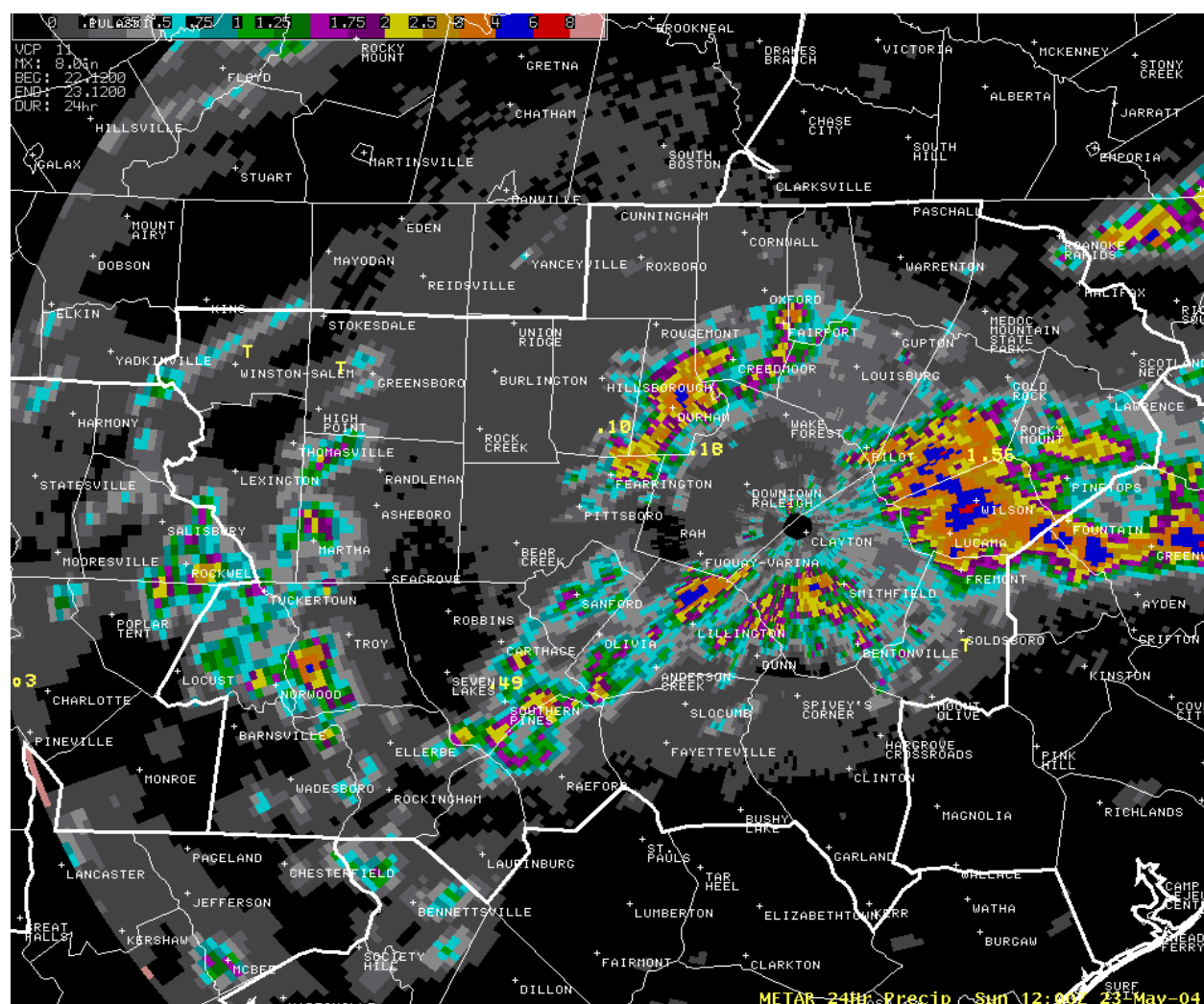


Figure 6 Raleigh Doppler Radar Precipitation Estimates from May 22, 2004.

In contrast to the localized heavy rain on the 22nd, thunderstorm activity was widely scattered across the state during the month. Several areas over central North Carolina recorded less than an inch of rainfall after May 3rd. The observing location in Raleigh at North Carolina State University (NCSU), only recorded 0.65 inches of rain during the last 28 days of the month. The monthly total at NCSU was a mere 2.66 inches. The total at RDU was 3.44 inches (only 0.35 inches below normal).

Figure 7 shows rainfall amounts during days in which precipitation was observed at two reporting stations in Wake County. While only 10 miles apart, the Raleigh-Durham Airport (RDU) and the Raleigh (NCSU) sites show a distinct variability in daily rainfall amounts due to the localized nature of the thunderstorm activity. More importantly, it illustrates the lack of significant rainfall during the last 28 days of the month.

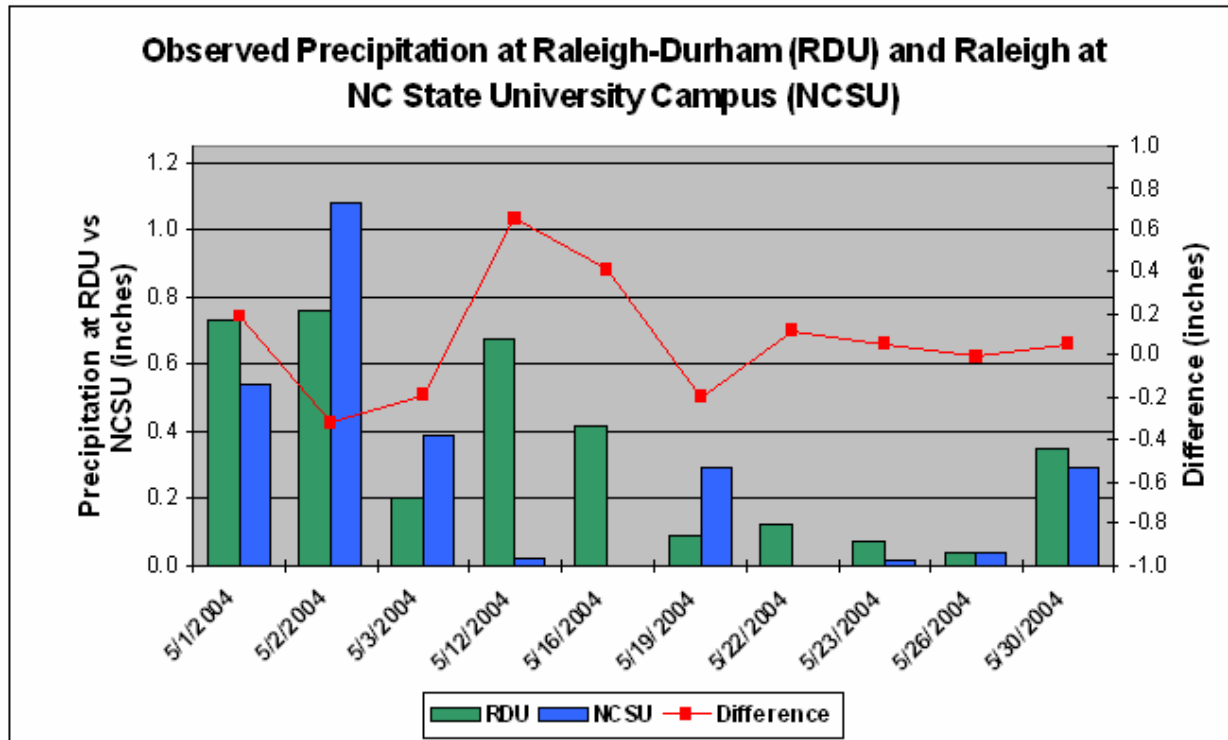


Figure 7 Rainfall reports during days in which precipitation fell at Raleigh (NCSU) and the Raleigh-Durham Airport (RDU) in Wake County.

Severe Weather and Tornado Reports in May 2004

Only one confirmed tornado was reported in central North Carolina during May 2004. There were several large hail and damaging wind events during the month but the total number of severe weather events were below normal.

The tornado event occurred on Sunday May 2, 2004. Convection developed as a deep trough of low pressure passed over the state. Several waves of showers and thunderstorms moved across North Carolina during the late morning and early evening hours. The thunderstorms became increasingly intense during the afternoon, with several thunderstorms becoming severe. There were several reports of wind damage with one confirmed tornado in northern Harnett County near the community of Kipling. No injuries were reported and damage estimates were not available.

A summary of the May 2, 2004 event is available at the web site below...

<http://www2.ncsu.edu/eos/service/pams/meas/sco/research/nws/cases/20040502/>

On May 31, widespread severe weather and flooding affected the Tennessee Valley, the Ohio Valley, and the western slopes of the Appalachians. Wind damage was reported in many mountain counties from Bryson City and Franklin through Asheville and Boone.

Current, Semi-Annual and Annual Precipitation Trends

Precipitation amounts at Greensboro and Raleigh continued to be drier than normal for the most recent 6-month period (December 2003 through May 2004). This marked the 8th consecutive month of below normal precipitation at Greensboro. During this 8-month period (October 2003 through May 2004), the rainfall deficit at Greensboro totaled 11.72 inches. In the 6-month period prior to the beginning of this dry streak (April through September 2003); there was a rainfall surplus of 19.01 inches at Greensboro. In the past 12 months (June 2003 through May 2004), Greensboro has seen a net surplus of only 3.00 inches.

At Raleigh, May 2004 was the 5th consecutive month of drier than normal conditions. In the past 8 months, only December 2003 had above normal precipitation. During this 8-month period (October 2003 through May 2004), the precipitation deficit at Raleigh totaled 6.32 inches. In the 6-month period leading up to the dry spell (April 2003 through September 2003); Raleigh had a rainfall surplus of 5.78 inches. During the past 12 months (June 2003 through May 2004), Raleigh has seen a net surplus of rainfall of only 0.02 inches.

Semi-annual and annual precipitation trends at Raleigh and Greensboro are highlighted below and on the following page in Figure 8 and Figure 9 respectively.

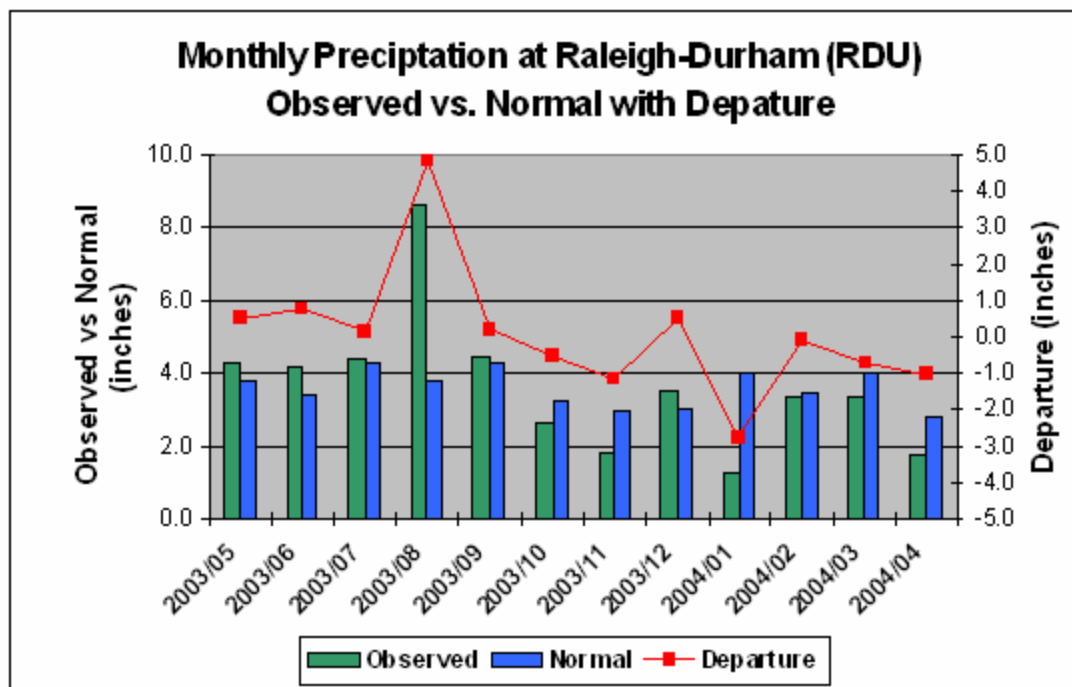


Figure 8 Chart depicting the semi-annual and annual precipitation trends at Raleigh-Durham (RDU).

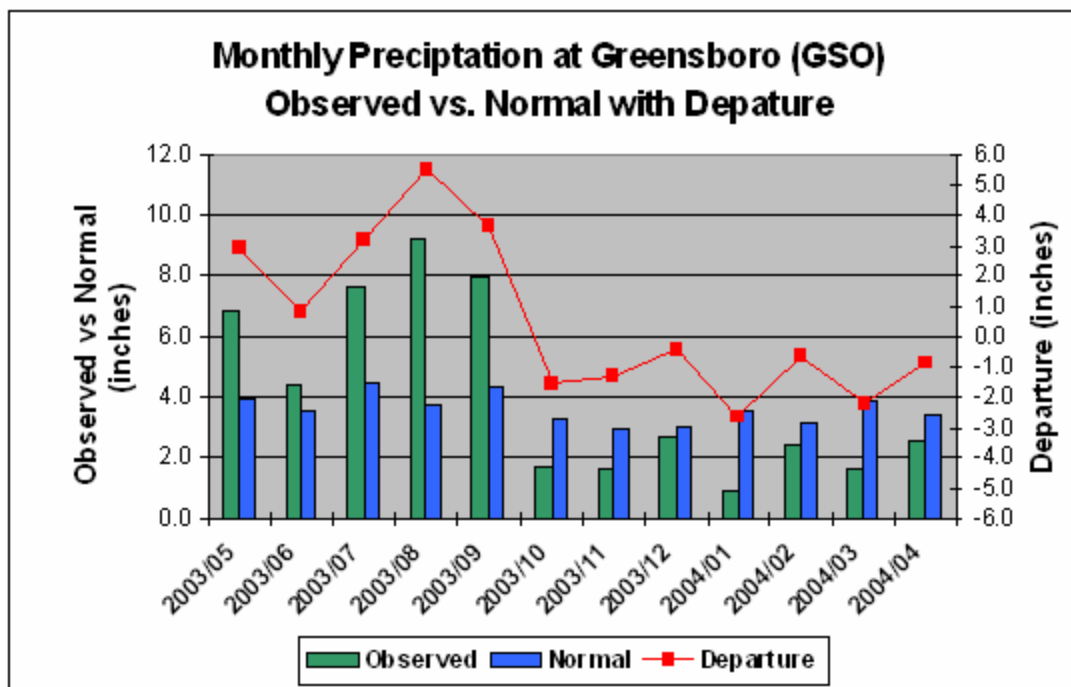


Figure 9 Chart depicting the semi-annual and annual precipitation trends at Greensboro (GSO).

Although precipitation amounts during the past 6 months indicate a significant dry period across North Carolina, the tremendous surplus of precipitation prior to October 2003 offsets the recent dry period. Currently, there is no long-term drought or ground water shortage in North Carolina. However, as indicated by the Drought Monitor, most of southwestern North Carolina is in a short-term drought. Extended dryness into summer would increase the threat of a long-term drought and would begin to deplete ground water supplies. The outlook for the summer of 2004 from the Climate Prediction Center is for short-term drought conditions to gradually ease.

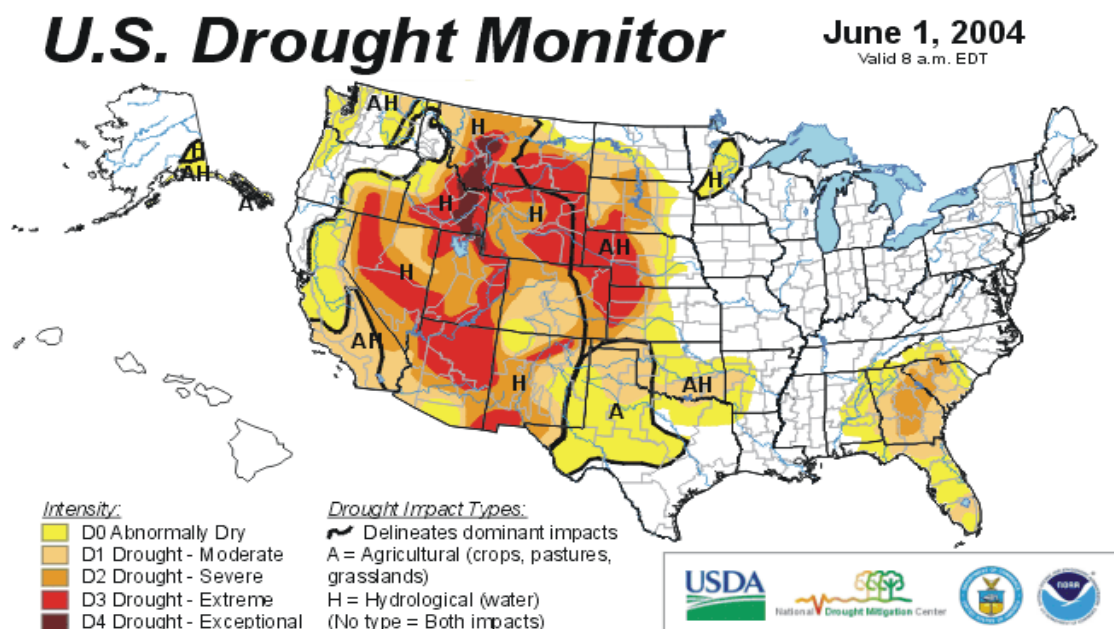


Figure 10 U.S. Drought Monitor depicts abnormally dry conditions across southwestern North Carolina.

Updated Freeze Data from the spring of 2004

Figure 11 below is a map detailing the date of the last spring freeze for this season (date of last 32 degree temperature reading). The map is based on data from National Weather Service (NWS) observing systems and NWS Cooperative Observer sites. Note that while many areas of the Piedmont, Coastal Plain, and Coastal Area had their last freeze April 6th (shown in light blue) several areas from Asheville to Hickory to Greensboro did not record a freeze after March 23rd or 24th (shown in yellow). Most mountain and northern foothill areas recorded their last freeze on May 4th.

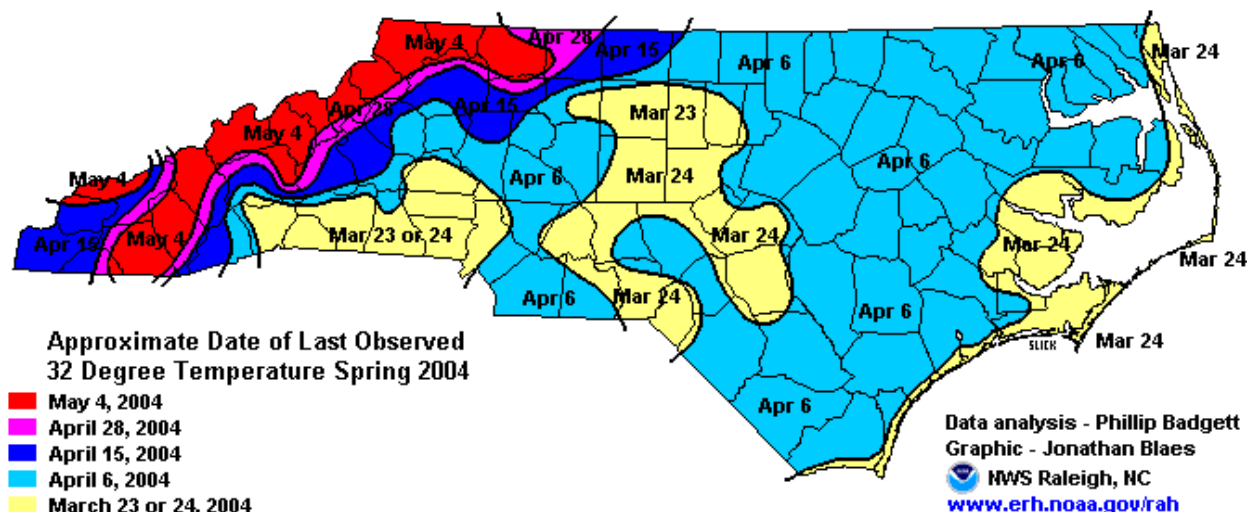


Figure 11 Analyzed map of the last of occurrence of 32 degree surface temperatures across North Carolina

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Thanks to Michael Moneypenny and Kermit Keeter